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PRUNING FRUIT-TREES.

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THE nature of plants is to grow and reproduce their kind by seed. The seed of fruit-bearing trees has a covering which is edible. The edible portion of fruits in the wild state is comparatively small, and of little account for domestic use. Through years of improvement by selection, propagation, and cultivation, there has been a great change from the natural product to the much-sought-after commercial fruit of the present day. Among the practices which have brought about this improvement, and which are upholding the present high standard of size and quality, pruning is not the least important.

By adopting a proper system of pruning in the orchard, together with good cultivation, soil-fertilization, and spraying, it is possible to produce the maximum yields of first-quality fruit. Pruning alone will not, however, ensure success, for if cultivation, spraying, etc., are neglected, pruning will be of little value. On the other hand, if soil conditions are good and the trees making good growth, proper pruning is essential to success.

It is not the idea of the writer to go fully into all details of pruning, but just to mention in a brief way the principles and the best practices to follow. It shall be taken for granted that the reader understands a certain amount about the subject.

Before any one can prune intelligently it is necessary to know the characteristics of the species of fruit-tree being pruned, as well as the characteristics of the particular variety of the species. Besides, each tree will be a study in itself, so not a great deal of the success of the work will depend upon the common sense of the pruner. Pruning has also to be modified according to the soil and climatic conditions.

The peach differs from the other species of fruit-tree, in that it bears its fruit on lateral buds of the wood of the previous season's growth. The fruit-buds are generally found on the strongest branches, or upon the strongest and best-matured laterals on the strongest branches. Peach-trees must be pruned hard during the dormant season to encourage a good growth of new wood upon which to produce the next season's crop. The tree must also be pruned well out to allow for the heavy growth and the admission of abundance of light and air. For this reason the open head or vase form of tree is generally followed. By this system it will be seen that the new, strong fruit-bearing

wood will be produced in the centre as well as the outside portions of the tree. Consequently, fruit will be produced all through the tree, and not only on the outer extremities, as is often the case.

In the case of fruit-trees such as apples, pears, plums, cherries, apricots, etc., which bear their fruit on spurs, the fruit-spurs and the fruit-spur branches remain for a considerable time unless removed in any way; and, where it is also found that the weaker wood or branches will form fruit-spurs most freely, the practice is to head the trees to the semi-pyramid form. It is found that by this system a much stronger tree and fruit more uniform in colour and size can be produced.

As to variety characteristics, there are in the case of the apple, for instance, the upright strong growers like the Northern Spy, Rome Beauty, etc.; the strong growing, spreading sorts like the King, Gravenstein, etc.; the spindly growing varieties like the Jonathans, Spitzenbergs, etc.; and then there are the stocky, upright growing kinds such as the Wageners, Newtowns, etc. It can readily be seen from this that a knowledge of the variety is important before pruning can be done properly.

On light, sandy soil much heavier winter pruning must be given than on heavier soils, so it is also found that in the moister climates trees must be kept much more open than in the sections where more sunlight prevails.

Pruning is divided into two main branches—summer and winter. Summer pruning is generally practised only on young trees which are making excessive wood-growth, usually at the expense of fruit-spur formation. Winter pruning is practised to stimulate wood-growth, to invigorate the bearing wood, and to improve the size and quality of the fruit.

It must always be borne in mind that summer pruning has the opposite effect to winter pruning. In summer pruning a certain portion of the leaf surface is removed, and in this way the growth of the tree is checked. The leaves are the manufacturing part of the tree. This checking always has the tendency to throw the tree into fruiting. In winter pruning a certain portion of the wood and buds on the tree is removed, and the balance between the roots and top of the tree is disturbed, thus forcing more sap into those remaining parts, which naturally causes a greater growth. With this knowledge it can easily be ascertained what pruning should be practised on any particular tree.

Summer pruning is [illegible] practical with young trees until they come into bearing, aft[illegible] the amount of fruit borne should do all the summer pruning w[illegible]ary. The summer pruning practised on young, rank-growing tr[illegible]ing peaches, is to cut back all the weaker branches which are not required as leaders to stubs, about 6 inches in length, about the middle of August to the middle of September. Tipping, or heading back, is seldom practised unless the growth is over 3½ feet in length. Bearing, sweet cherry-trees are generally pruned just after the fruit is picked, for the best results. Young cherry-trees are given same pruning as apples.

Winter pruning, which is the most important pruning in the orchard, might be divided into six heads, as follows:—

(1.) To form or shape the tree:
(2.) To strengthen the structure:
(3.) To encourage the formation of fruit-spurs:
(4.) To allow for the admission of air and light:
(5.) To thin the fruit, improve its size and quality, and invigorate the tree:
(6.) To form a proper balance between the roots, top, and fruit.

FORMS OF HEAD.

In the orchard three forms or shapes of trees are found: (1) Vase or open head; (2) pyramidal or central leader; (3) semi-pyramidal or checked central leader. The vase or open-centre tree is most extensively used in growing peaches. The vase-shaped tree is naturally much weaker than the central-leader trees, and requires much wiring or propping. The fruit produced on vase-shaped trees is less uniform in colour and size. It is the lower, outside portion of the tree where the cull fruits are generally produced; therefore, endeavour to keep the tree most open at this point, so as to overcome this undesirable feature. If the outside portions of the tree are kept open, the top and centre of the tree will not suffer.

The pyramid tree is tall and expensive to handle. The side branches do not develop sufficient strength to carry the weight of fruit without being pulled down, umbrella-like, around the main trunk or leader. Consequently, considerable fruit is shaded; thus, is poorly coloured and inferior in quality.

The semi-pyramid tree has the good features of both the vase and the pyramid forms. The central leader is kept in the tree up to a height of about 8 or 9 feet, and then discontinued. The leader is checked from time to time so as to encourage the growth of the side branches. The leader should not be more than a few inches to a foot in advance of the side branches in young trees. This form of tree carries its weight more perpendicular to the trunk. The side branches can be kept sufficiently well apart to admit the fruit to colour well and attain the desired size. These branches are started low and then worked up by pruning to an upper and outer bud or branch, alternately. Those common, weak, lower branches, which generally droop to the ground with the weight of fruit, are replaced by strong, outward-crooked branches, giving the strongest possible side to the trees.

PRUNING FOR STRENGTH OF STRUCTURE.

Proper pruning of the young tree is most essential, because at this time the permanent foundation structure of the tree is being formed. The success or failure of the orchard depends largely upon the early training or pruning of the trees. To shape a young tree, the height of head, the spacing of the side branches on the main stem, and the selection and formation of wide-angle crotches are of paramount importance. The best form or shape of fruit-tree to grow is a low-headed, wide-spreading tree. It is found that trees with the first branch started at about 15 inches from the ground will grow faster and bear heavier crops of fruit and carry them more easily. The low-headed trees will also be much less subject to sun-scald or frost-cracking. One-year-old trees when planted should be cut back to 24 to 30 inches from the ground, and the first branch encouraged to form at about 15 inches from the surface of the ground. (In some sections where the snowfall is very great, the branches of young trees are often broken down by its weight. In these sections it is necessary to protect the young trees by tying them up to stakes for a few years until the branches are sufficiently strong to stand the pressure.) When it is possible to buy branched one-year-old trees it is advisable to do so. The branches on a one-year-old usually grow at right angles to the trunk; by selecting three of these laterals, well placed as side branches, and cutting them back to a bud on the upper side of the branch, at about 8 inches from the trunk, strong wide-angle crotches will be the result. Unbranched one-year-old trees of good stock, well planted and cared for, should make a good growth of side branches to work upon the following

year. (To encourage the lower buds on the trunk to start into growth, an old practice of making an incision with a knife just about the bud you wish to start is made use of to good advantage. This is not infallible, but, as a general rule, the checking of the upward flow of sap above any bud will tend to force it into growth.) In pruning these trees the following year, advantage is taken of the characteristic growth of all fruit-trees, which is to produce *the strongest, longest, and most upright branches from the highest buds.* Usually it is found that the third, fourth, and more branches from the top will have grown at a good wide angle from the trunk. Three of these are selected to form the side branches, and are cut back to about 8 inches from the trunk to an upper bud, as in the branched one-year-old trees. One or two of the stronger, more upright-growing leader branches are removed. By following this practice the weakest crotches are eliminated from the tree. The leader selected is pruned usually to an inside bud, to throw the growth towards the centre of the tree. It is not necessary that the central leader be straight. By the semi-pyramidal system it will be more or less crooked, due to the checking it receives from time to time in order to keep it back and to encourage the growth of the side branches. The leader should not be more than a foot in advance of the side branches of a young tree after it has been pruned. If consideration be given to the growth characteristics, all weak, acute-angle crotches can be prevented. There is no excuse for having narrow, weak-angle crotches, even in such varieties in apples as the Northern Spy, Winter Banana, etc., or in the many upright varieties of pears, etc. This same growth character is made use of in spreading, upright-growing varieties of fruit-trees. For example, if an upright tree is wished to be spread, the side branch is cut off to one, two, or even three buds above the bud in the direction we wish the tree to spread. This bud will throw a branch at a good angle from the main branch. The main branch is then cut back to this outward-growing branch, and thus the tree is spread. This system might be called branch-pruning. If a young tree has not made the desired branches from which to form a good head, do not be afraid to cut it back to a few inches of the ground, and allow it to make a good strong start again. A good branching system can nearly always be procured in this way. The future pruning of the side branches or the leaders for strength will have to be gauged by the pruner according to the character and amount of growth the particular variety is making, as no orthodox rule can be followed.

TO ENCOURAGE THE FORMATION OF FRUIT-SPURS.

To encourage the formation of fruit-spurs on the young trees, stubbing back all the weaker unrequired branches to about 6 inches in length is practised. The heading-back of the leader branches is often discontinued for a year or so. This has the effect of forming fruit-spurs from nearly all the buds except the terminal bud. The branches can then be headed back for strength the following year. Moderate winter pruning is always more likely to encourage the formation of fruit-spurs than is heavy pruning. If a tree is not setting fruit-spurs well, it is a good plan to discontinue heading back for a season or so, after which the branches can be headed back for strength.

ADMISSION OF LIGHT AND AIR.

The proper distribution of light and air in our fruit-trees is essential. Strong, vigorous fruit-spurs will not form well in the shade. If they do form, they will be long, weak, spindly ones, upon which small, colourless inferior fruit will be produced. The amount of light regulates the colour of the

fruit, which is of the greatest importance when the product is placed upon the market. Light is also one of the greatest factors in the production of uniformity in the size as well as the colour of fruit. Uniformity is of the greatest importance if the fruit is to be packed and marketed most successfully. The important role which light plays must always be borne in mind when pruning trees. Where the least sun and light strikes the trees is where trees should be kept the most open. The portion of the trees receiving the least amount of light is shown by the poorly coloured, small-sized fruit, and where long, weak, spindly fruit-spurs are found. This condition is generally found on the lower outside portion of the tree. Therefore, if the highest quality of fruit is to be produced, the outside of our trees *must be kept well pruned out* to allow plenty of light to penetrate right into the centre of the tree. This is one of the main reasons for favouring the semi-pyramid tree. It is generally conceded that on young trees the main branches should not be allowed to grow one directly above the other, or should not be closer at the tips than 16 to 24 inches apart after pruning. This distance has to be regulated according to the amount of sunshine in the particular section; for example, branches might be kept a little closer in the Dry Belt sections than in the Lower Mainland or West Kootenay Districts.

THINNING FRUIT BY PRUNING.

If the characteristic growth of different varieties of fruits is known, a great deal of the work of thinning the fruit can be most economically done at the time of pruning. It is characteristic of many varieties to form too many fruit-spurs, as, for instance, such varieties as the Jonathan, Wealthy, etc. These spurs can be thinned out, or the fruit-spur branches cut back, thus lessening the number of fruit-spurs on the branch. By so doing, not only is the fruit thinned, but the excessive drain on the tree's vitality is prevented, and the production of higher-quality fruit from the remaining spurs is the result. This latter practice of cutting back fruit-spur branches is done *principally* on old bearing trees, where they will often attain 2 feet or more in length and have twenty to sixty fruit-spurs on each branch, when the branch is only capable of carrying and bringing to successful maturity about three to six fruits.

With young trees up to about the sixth year, pruning is practised to encourage the formation of fruit-spurs and fruit. When trees commence to bear well, the pruning is principally to thin the fruits, to strengthen the tree, and to keep the trees open enough to admit plenty of air and light. In other words, endeavour to make the fruit regulate the growth as soon as possible. In old bearing trees winter pruning is practised principally to allow plenty of light and air to penetrate to all parts of the tree, to keep the tree balanced and shapely, and to cut back the fruit-spur branches and limbs to invigorate them, and to foster the production of the highest quality of fruit.

PROPER BALANCE ESSENTIAL.

It must be remembered that the development of the roots, top, and the fruit must assume a balance. The roots might be called the boiler of the tree, the top the engine, and the fruit the load. If the boiler is very large and the load light, the engine will be forced, and a heavy growth of wood will be the result. If the boiler is weak and the engine strong, the engine cannot be worked to its full capacity; therefore the growth of wood and the load of fruit will be correspondingly small. If the load is heavier than the boiler

or the engine can maintain or carry, a load of small, poor-quality fruits or breakage of the engine or tree will be the result. It might be illustrated in another way—that the load of fruit should act as the governor between the boiler and the engine, or the roots and the tops. It may be seen by the above comparisons that a good balance between the various parts of the tree is absolutely essential if the best results are to be expected. In winter pruning, the balance between the roots and the top of the tree is disturbed. When a portion of the top is cut off, the roots exert their whole force upon the smaller top, and heavy wood-growth is the result. On the other hand, if the pruning of the top is done during the summer, the growth is checked, because a portion of the leaves or the manufacturing part of the plant has been removed, and, as a consequence, there is a tendency to force the tree into fruiting. Thus by pruning at the proper time and in various degrees the balance of trees can be regulated. The quantity of fruit allowed to remain on the trees is, possibly, the best summer pruning that can be practised. It is then necessary to encourage the formation of fruit-spurs in young trees by cutting back all the stronger of the ingrowing branches, or those not required as main branches, to stubs of 6 or 7 inches in length, during the summer (about the middle of August to the middle of September). On these stubs fruit-spurs will generally form, and eventually fruit. All the weaker branches on the young trees should be allowed to remain unpruned unless they are over a foot in length, as these branches form fruit-spurs most freely in all fruit-trees excepting peaches. It is found, also, when the terminal shoots or leaders are not pruned back for a year, that the terminal bud, being the strongest, will grow into a branch, and a large proportion of the remaining buds will usually form fruit-spurs. The main branches can be headed back the following year fairly hard, for strength. By following the practice, the young trees may be forced into fruiting quite early. When the trees come into bearing, the system is to make the fruit do the majority of the pruning. In other words, judicious thinning of the fruit will more or less regulate the growth of the trees. Moderate winter pruning is always more likely to encourage the formation of fruit-spurs than is heavy pruning. After about the sixth year the pruning required on all trees except peaches should be very little. Heavy winter pruning, if necessary, should be done the winter previous to a heavy crop. The amount of fruit which will set can then be used as a check on the excessive growth which would naturally follow heavy winter pruning. The pruning of bearing trees is principally to open up the head, to allow for the penetration of light and air, to encourage or discourage the formation of fruit-spurs, according to the vigour of the tree, or to improve the size, colour, and quality of the fruit.

SUMMARY: FOR SUCCESSFUL PRUNING OF ALL FRUIT-TREES EXCEPT PEACHES.

At Time of Setting One-year-olds.—Cut back to about 24 to 30 inches from ground. If side branches are present, select the three most suitable, and cut back to an upper bud at about 6 to 8 inches from trunk. Start the first branch at about 15 inches from the ground.

First Year after Setting.—Winter-prune, leaving three main side branches evenly distributed around the main stem on about 1 foot of space. Allow a leader to grow.

Second Year.—Summer-prune all stronger branches not required as main leaders to stubs about 6 inches in length. If leader branches are making

over $3\frac{1}{2}$ feet growth, pinch off *the tips* during summer. Winter-prune all leaders for strength, and check centre leader if required.

Third Year.—Summer-prune all stronger growths not required as main branches to stubs, and tip back leaders if making over $3\frac{1}{2}$ feet growth. Winter-prune for strength and form.

Fourth Year.—Thin fruits, if necessary, according to the growth the tree is making. Summer-prune stronger unrequired branches to stubs. Winter-prune for strength, and check leader if necessary. Cut out some of the stronger branches and leave weaker ones for fruit.

Fifth Year.—Thin fruit according to growth. Summer-prune all the weaker unrequired branches to stubs. Winter-prune for strength, light, and shape.

Sixth Year.—Thin fruit according to growth. Summer-prune, if necessary, the weaker unrequired branches to stubs. Winter-prune for strength, light, and shape.

Trees in Bearing. Thin fruit-spurs according to growth the tree is making. Winter-prune for strength, and to keep the trees open enough to allow the penetration of light and air, and to shape the tree.

Old Bearing Trees.—Winter-prune to thin the fruit by removing a number of the fruit-spurs, or by cutting back long fruit-spur branches to invigorate those fruit-spurs left. Prune to invigorate the growth of the tree, to open out the tree to allow plenty of light and air to enter, and to shape and balance the trees.

In General.—Encourage the formation of fruit-spurs on young trees. Let them bear according to the growth they are making. Thin branches most where least light can enter. Avoid all narrow, weak crotches and spread or contract your trees by taking advantage of natural-growth characteristic. Keep your pruning-tools sharp. When removing large branches, prune close and in line with the remaining parts to facilitate quick healing of wounds. Use grafting-wax on large wounds to prevent water from entering the wood until nature heals it over.

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